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Community Mapping for information sharing, crowdsourcing and decision making

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The project

We describe goals and results achieved until now within the Mappe di Comunità 3.0 project (<http://ontomap.dyndns.org/>, 2014-2015), funded by Fondazione CRT, Torino, and carried out by the Università di Torino and Politecnico di Torino, in collaboration with CSI Piemonte. The project aims at developing a knowledge sharing model, and an online platform, for the integration of official cartographies developed by the PA, and spontaneous ones, in a unified framework supporting information search and crowdsourcing of territorial open data. The application domain is that of Participatory Decision-Making processes, aimed at favoring the inclusion of citizens in the design of public policies and, orthogonally, a reflection on territorial identity. The goal is to convey the knowledge of the perception of places, creating an indicator of territorial identity -or many territorial identities- inhabiting the city. Within this context, the project focused on the development of a tool for the creation and management of Community Maps in order to enable different communities to maintain their own distributed information sharing spaces for the representation of specific viewpoints on the local territory. Overall, the project is proposed as a tool to facilitate the dialogue between citizens and institutions, improving communication through an e-map of the city.

The OnToMap system

The main result of the project is the web application OnToMap - Mappe di Comunità 3.0, which can be used to consult spatial data, create custom maps, report to local administrators critical issues or new proposals. OnToMap exploits an ontological layer which makes it possible to:

- integrate heterogeneous geo-data, originated from different data sources, and manage them as linked data;
- support the description and classification of new information items, which can be integrated in the existing knowledge base for immediate usage and retrieval;
- describe semantic relations among information items to express not only spatial relations, but also different levels of abstraction in the description of entities (from general concepts, such as *services* to specific ones, such as *private services* and *public ones*) and thematic relations;
- configure the system to describe other types of information. E.g., maps describing biodiversity.

The ontology describes territorial information in a rich and rigorous way and makes it possible to specify different viewpoints on data. Specifically, it represents the interaction tool for browsing the information space: by navigating the ontology graph users can select the spatial information they are interested in, and they can search for semantically related data, generating dynamic maps which reflect individual interests. Through the graph it is possible to identify the constitutive dimensions of the territory, which take into account the environmental, urban, cultural and social components.

Figure 1 shows a view on the ontology developed for the system where the blue nodes in the graph represent the concepts which the user has selected for information visualization in the map.

On the basis of the users' selections the system displays the relevant information on an interactive map which can be used to overview spatial information as well as to retrieve detailed information about specific elements of the territory, their relations with other elements, and so forth. The maps can also be used to crowdsource information from people, in terms of comments which can be associated to specific items in the maps, or to selected geographic areas, as shown in Figure 2.



Fig. 1: information search in OnToMap

As both private and public maps can be created, different user communities can employ the OnToMap system in order to build their own representation of the territory.

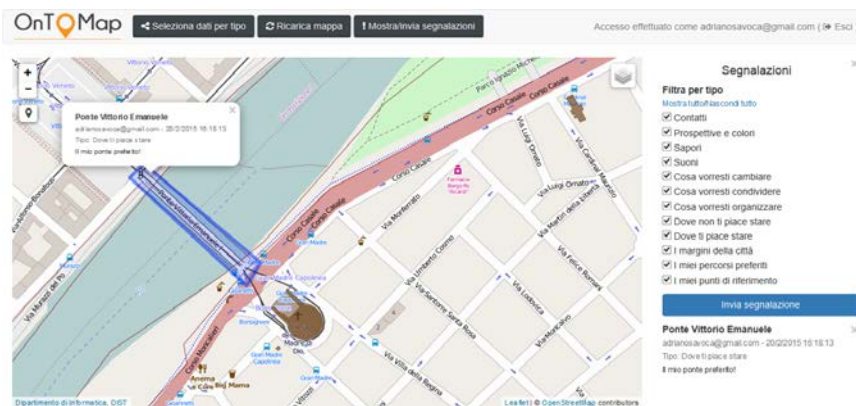


Fig. 2: Visualization of a comment associated to an element of the map

Beyond OnToMap

The ontological approach to the construction of decision-making processes in the context of planning represents an emerging methodology which poses itself as an innovative perspective for expressing the complexity of the semantic aspects relative to the territorial representation with respect to traditional e-Participation tools (PGIS, PPGIS, VGI), which do not support a semantic search for information. Moreover it opens new research avenues related to the representation of rich territorial knowledge, not only for knowledge sharing, but also for planning and reasoning. In this respect, a direction we are currently pursuing is that of representing in the system ontology the norms and rules that constrain the possible uses and changes to the territory according to regulations issued by possibly different institutions. Being able to retrieve the norms that apply to particular tasks and parcels of the local territory will enable the use of automatic reasoners for supporting activities such as the analysis of critical issues, the suggestion for improvements and the decisions involved in urban planning.